REMARKS

In response to the above Office Action, claim 1 has been amended to limit the melt flow rate of the polyolefin resin to 500 to 3,000 g/10 min. Support for the claimed range can be found on page 9, lines 18-21 of the specification. As a result, claims 12 and 13 have been cancelled.

In addition, claim 1 now includes the limitation that the extremely fine fibers do not have a sheath-core structure. Support for this can be found on page 8, lines 23-32.

In the present invention, the extremely fine fibers have a structure in which a discontinuous phase, in a longitudinal direction, of the polyolefin resin is scattered in the surface of the extremely fine fibers. Namely, when a polyester extremely fine fiber is observed by SEM photographic observation after melting treatment of polyolefin, as shown in Fig. 3, holes and linearly scattered traces from which the polyolefin has been melted, to fall out, are observed in the fiber surface. Therefore, the extremely fine fiber has the structure that the polyolefin contained in the polyester resin that forms the extremely fine fiber is present in the surface of the fiber while bleeding out (see page 6, lines 15 to 23, of the specification).

However, when the structure has a sheath-core structure (e.g., a polyolefin approximately in a sheath portion, and a polyester approximately in a core portion), integration by thermocompressive bonding causes the following drawbacks: melt sticking of the extremely fine fiber nonwoven fabric layer and the filamentary fiber nonwoven fabric layer becomes incomplete which lowers the peel strength, and the olefin bleeds or oozes out in the surface layer and causes a process problem by staining the roll surface (see page 8, lines 23 to 32 of the specification). Accordingly, the extremely fine fibers of the present invention do not have a sheath-core structure.

Also, when the polyolefin resin has a larger melt flow rate than the polyester resin, i.e., [(melt flow rate of polyester resin) / (melt flow rate of polyolefin resin)]<1.0, the polyolefin resin is likely to bleed out more easily. Accordingly, as to the polymer viscosity of the polyolefin resin to be used, the MFR of the polyolefin resin should be from 500 to 3,000 g/10 min, which is the MFR of a high flow type resin (see page 9, lines 11 to 24 of the specification). The polyester resin used in the examples has a solution viscosity of 0.48 η_{sp}/c, i.e., a MFR of 280 g/10 min, and the polyolefin resin used in examples has a MFR of 700 g/10 min (see page 21, lines 30 to 35 of the specification). Therefore, the ratio (melt flow rate of polyester resin) / (melt flow rate of polyolefin resin) is 0.4.

In the Office Action, the Examiner rejected claims 1, 2, 5, 6, 10 and 12-17 under 35 U.S.C. §103(a) for being obvious over Perkins, Bansal, and a newly cited reference to Unitika (JP 07-207566). It is assumed the Examiner meant Perkins "in view of" Bansal and Unitika and that the Examiner did not intend to reject all of the claims under each reference individually. The withdrawal of the rejection of the claims for being obvious over Perkins in view of Bansal is appreciated. As noted on page 2, paragraph 2 of the Office Action, the rejection was withdrawn because the "references fail to provide for polyolefin resin mixed with polyester resin in a discontinuous phase in the longitudinal direction of the surface of the extremely fine fibers."

The comments regarding Perkins and Bansal in the above Office Action in paragraphs 4a-f are the same as in the Office Action of January 4, 2008 which were responded to, successfully as noted above, in the Reply filed May 5, 2008. Hence the arguments will not be repeated here.

However, the Examiner believes as set forth in paragraph 4g on page 5 of the Office Action, that the noted limitation missing in Perkins in view of Bansal would be an obvious modification thereof in view of Unitika which "provides for the claimed polyolefin discontinuity in the surface of the extremely fine fibers."

As noted above, one of the features of the claimed invention is that it does not have a sheath-core structure. On the contrary, as noted by the Examiner (page 5, lines 3-4 of the Office Action), in Unitika, the extremely fine fiber has a core-sheath structure, in which a polyester-based polymer constitutes substantially the sheath part and a polypropylene-based polymer constitutes substantially the core part. Although the main material is a polyester-based polymer, a polypropylene-based polymer is unevenly distributed in the center part, so that the extremely fine fiber can exhibit flexibility (see paragraph [0013] of Unitika). See Exhibit A for this and subsequent reference to paragraphs of Unitika which is an English translation of paragraphs [0013] to [0016] of the reference prepared by Applicants.

Further, in order to obtain an extremely fine fiber having such a core-sheath structure by a melt blown method, a polyester-based polymer having a melt flow rate at a ratio of 1.5 to 6.0 to the melt flow rate of the polypropylene-based polymer, i.e., $1.5 \leq [$ (melt flow rate of polyester-based polymer) / (melt flow rate of polypropylene-based polymer) $] \leq 6.0$, is used (see paragraph [0014] of Unitika). When polymers having such a melt flow rate ratio and being incompatible with each other are mixed and the mixed resin is fed to a spinneret for melt spinning, the polyester-based polymer having the larger melt flow rate flows in the vicinity of the tube wall of the orifice, where the channel resistance is high, and the polypropylene-based polymer

having the smaller melt flow rate flows in the center part of the orifice, where the channel resistance is low, whereby an extremely fine fiber having a substantially core-sheath type structure is obtained. However, if the ratio of the melt flow rate of the polyester-based polymer becomes less than 1.2, a so-called sea-island structure, where in the transverse cross section the polyester-based polymer is not unevenly distributed to the sheath part, but is interspersed like dots in the polypropylene-based polymer, is obtained and a substantially core-sheath type structure is not formed (see paragraph [0016] of Unitika).

Therefore, Unitika does not teach the above-claimed structure of the extremely fine fibers used in the present invention. Further, since Unitika suggests the use of a polyester polymer having a larger MFR and a polypropylene polymer having a smaller MFR, Unitika also does not teach the use of a high flow type polypropylene polymer having the claimed MFR of 500 to 3,000 g/10 min.

In summary, the combination of cited references do not at least show the claimed structure of the extremely fine fibers or the high melt flow rate of the polyolefin resin. Accordingly, it is submitted that neither claim 1, which includes these features, nor claims 2, 5, 6, 10 and 14-17 dependent therefrom can be considered obvious over the combination in view of the requirements of M.P.E.P. §2143.02 and .03 that all claimed elements must be considered and must have been known in the prior art cited against the claimed invention to support a conclusion that the claims would have been obvious.

Withdrawal of the rejection of the noted claims over the cited combination of references and their allowance is therefore requested.

In view of the foregoing amendments and remarks, Applicants respectfully request reconsideration and reexamination of this application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: January 26, 2009

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Attachments: Partial Translation of Unitika (JP 07-207566)

Partial Translation of Unitika (JP 07-207566)

1. Paragraph [0013]

In the present invention, an extremely fine fiber is obtained using this mixed resin by a melt blown method. The fineness of this extremely fine fiber is 0.7 denier or less. If the fineness exceeds 0.7 denier, the filter performance (that is, a performance of removing fine grits and dusts) decreases and this is not preferred. As regards the fineness of the extremely fine fiber, for a plurality of units of a sample, a cross-sectional area is calculated from the profile dimension in an electron micrograph, each fineness is determined by performing density correction, and an average value thereof is defined as the fineness of an extremely fine fiber. Also, as for this extremely fine fiber, in its transverse cross-section, a polyester-based polymer constitutes substantially the sheath part and a polypropylene-based polymer constitutes substantially the core part. Here, a polyester-based polymer constituting substantially the sheath part means that a polyester-based polymer is unevenly distributed in the vicinity of the extremely fine fiber surface over the mixing ratio in the mixed resin. Also, a polypropylene-based polymer constituting substantially the core part means that a polypropylene-based polymer is unevenly distributed in the vicinity of the center part of the extremely fine fiber over the mixing ratio in the mixed resin. In this way, the extremely fine fiber has a core-sheath structure and although the main material is a polyester-based polymer, a polypropylene-based polymer is unevenly distributed to the center part, so that the extremely fine fiber can exhibit

flexibility.

2. Paragraph [0014]

For obtaining an extremely fine fiber having such a core-sheath structure by a melt blown method, the fiber can be easily obtained, for example, by the following method. First, a polypropylene-based polymer and a polyester-based polymer, which are of the type described above, are prepared. Here, an important matter is to prepare a polyester-based polymer having a melt flow rate at a ratio of 1.5 to 6.0 to the melt flow rate of the polypropylene-based polymer. That is, $1.5 \leq [(\text{melt flow rate of polyester-based polymer}) / (\text{melt flow rate of polypropylene-based polymer})] \leq 6.0$. In particular, the melt flow rate ratio is preferably from 2.0 to 5.5, more preferably from 2.5 to 5.0. In the present invention, the melt flow rate is measured by the following measuring method. That is, using a melt indexer-melt flow meter, the discharged amount of a molten polymer per 10 minutes is measured under the conditions of an orifice diameter of 0.4 mm, an orifice length of 1.2 mm and an applied load of 2,160 g, and the amount (g) obtained is defined as the melt flow rate. Incidentally, as for the temperature here, the measurement is performed under the same temperature condition as the temperature in actual melt spinning. As well understood from this, the melt flow rate of each of the polyester-based polymer and the polypropylene-based polymer can be arbitrarily adjusted by changing the kind of the polymer or changing the temperature in melt spinning, so that the melt flow rate ratio in the above-described range can be easily obtained.

3. Paragraph [0015]

The relative viscosity of the polyester-based polymer is set to be from 1.20 to 1.32. The relative viscosity is preferably from 1.21 to 1.30, more preferably from 1.22 to 1.28. The relative viscosity of the polyester-based polymer as used herein is determined by dissolving 0.5 g of a sample in 100 ml of a mixed solvent of phenol and ethane tetrachloride in an equivalent weight ratio and measuring the solution by an ordinary method under the condition of a temperature of 20°C. If the relative viscosity of the polyester-based polymer is less than 1.22, the polymerization degree is too low and there arises a tendency that pelletization of the polymer becomes difficult or the tensile strength of the obtained extremely fine fiber decreases. Conversely, if the relative viscosity exceeds 1.32, the polymerization degree is excessively high and when spun by a melt blown method, a polymer ball tends to be readily produced on the spinneret surface, making it difficult to form an extremely fine fiber. Also, a great deal of energy tends to be required for increasing the flow rate of the polyester-based polymer in a melted state.

4. Paragraph [0016]

By setting the melt flow rate ratio to the range above and obtaining an extremely fine fiber by a melt blown method, an extremely fine fiber having a substantially core-sheath structure where a polypropylene-based polymer is unevenly distributed to the core part of the extremely fine fiber and a polyester-based polymer is unevenly

distributed to the sheath part of the extremely fine fiber, is formed. That is, when polymers having such a melt flow rate ratio and being incompatible with each other are mixed and the mixed resin is fed to the spinneret for melt spinning, a polyester-based polymer having a larger melt flow rate flows in the vicinity of the tube wall of an orifice, in which the channel resistance is high, and a polypropylene-based polymer having a smaller melt flow rate flows in the center part of an orifice, in which the channel resistance is low, whereby an extremely fine fiber having a substantially core-sheath type structure is obtained. Accordingly, if the ratio of the melt flow rate of the polyester-based polymer becomes less than 1.2, a so-called sea-island structure where in the transverse cross-section, the polyester-based polymer is not unevenly distributed to the sheath part but is interspersed like dots in the polypropylene-based polymer, is provided and a substantially core-sheath type structure is disadvantageously not formed. Conversely, if the ratio of the melt flow rate of the polyester-based polymer exceeds 2.5, an extremely fine fiber having a substantially core-sheath type structure may be obtained, but the fiber cannot be efficiently spun and this is not preferred. More specifically, since the melt flow rate is excessively different between two polymers, the spinnability is extremely deteriorated due to production of a polymer bead on the surface of a spinneret for melt spinning or generation of a twist phenomenon in the discharged yarn, and at the same time, the uniformity of the spun yarn disadvantageously decreases.